MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2018 / 2019

PPS 0335 – PROBLEM SOLVING AND PROGRAMMING

(Foundation in Information Technology)

13 OCTOBER 2018
2.30pm – 4.30pm
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 5 pages (excluding the cover page) with 5 questions only.

2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the Answer Booklet provided.

QUESTION 1 [10 Marks]

a. Solutions to problems can be derived using two mechanisms in general and they are *algorithmic* solutions and *heuristic* solutions.
   i. Briefly explain both mechanisms to solve problems.

(2 marks)

   ii. Between the two mechanisms which one can be used to solve computer problems? Explain your answer.

(2 marks)

b. When structuring a computer program, you can use four different logic structures to ensure the readability and efficiency of the program to produce a result. Name the **FOUR (4)** logic structures and explain briefly.

(4 marks)

c. Related to **QUESTION 1 (b)** above, explain **TWO (2)** other techniques to improve the readability of a computer program.

(2 marks)

QUESTION 2 [10 Marks]

a. What is the result of the following expressions when they are run in C++?
   i. $2 + 3 - 6 < 4 * 5$
   ii. $2 + 3 - (6 < 4) * 5$
   iii. $2 + (3 - 6 < 4) * 5$
   iv. $2 + 3 - (6 < 4 * 5)$

(2 marks)

b. Complete the following truth table, **Table 1**, by filling in the blanks with *True* or *False* as appropriate.

Table 1

	Input		Output	
	x	y	x AND y	x OR y
i.	False	False		
ii.	False	True		
iii	True	True		

(3 marks)

Continued ...

c. Write each problem as a computer equation. Create suitable variables for each problem. An example of a problem with its computer equation is given below.

Problem: *How many wheels on X cars?*
Computer equation: *total_wheel = 4 * X*

i. How much would a shopper have to pay for sweater with a 40% discount? Let ***P*** represents the price of the sweater.
ii. Adult tickets cost RM5, children tickets cost RM2 and senior tickets cost RM3. Let ***X, Y, Z*** represents number of adult, children and senior buying the tickets. What is the total ticket sale?
iii. Ashley has 25 flowers. The number of flowers Sam has is ***Z*** times more than what Ashley has. How many flowers does Sam have?
iv. A toy factory produces ***T*** dozens of fluffy toys per day. Only six fluffy toys fit into 1 box. How many boxes does the factory need per day?
v. Fuel costs RM2.20 per litre. Don's car can hold ***L*** litre of fuel at a time. Don has a quarter of a tank of fuel, how much will it cost him to top off the tank?

(5 marks)

QUESTION 3 [10 Marks]

a. Write an algorithm that reads a list of integer numbers from the user. The algorithm stops when it has gotten the first ten odd numbers. You can use repeat/until to control the loop. Then, the algorithm will calculate and print the average of the ten odd numbers. The sample output of the algorithm is shown in **Figure 1**.

(4 marks)

```
Enter a number: 2
Enter a number: 1
Enter a number: 3
Enter a number: 3
Enter a number: 5
Enter a number: 4
Enter a number: 6
Enter a number: 7
Enter a number: 9
Enter a number: 7
Enter a number: 3
Enter a number: 4
Enter a number: 5
Enter a number: 3
Average is 4
```

Figure 1

b. A telemarketer earns RM450 per week plus 11% commission on sales. Develop a problem analysis chart (PAC) to find her total pay for a week in which her sales were RM950.

(3 marks)

c. Develop a flowchart that reads two numbers and multiplies them together and print out their product.

(3 marks)

Continued ...

QUESTION 4 [10 Marks]

a. The Gordon Cooking School runs two short cooking courses at its campus. Data concerning the courses' cost is shown below in **Table 2**. There are a total of 60 students enrolled in those two courses. Develop an input-processing-output (IPO) chart to determine the expenses that the management has to spend for the two courses and the income that they will receive from the students' enrollment.

Table 2

	Cost per course (RM)	Fee per student (RM)
Instructor salary	2000	500
Supplies	150	
Administrative expenses		5

(4 marks)

b. Propose suitable data types for the following items in **Table 3**.

Table 3

	Item	**Data type**
1.	Number of kilometer driven	
2.	The candidate name	
3.	The current price	
4.	The quantity of item purchased	
5.	Any letter from the computer keyboard	
6.	Set a variable either true or false	

(3 marks)

c. Convert the following *while/whileend* pseudocode to *repeat/until* pseudocode.

```
start:
    set sum to 0
    read x
    while (x <> 0)
        if (x < 100)
            set sum to x + sum
        endif
        read x
    whileend
    print sum, sum + 2
end:
```

(2 marks)

d. Related to **QUESTION 4 (c)** above, suppose the following input is x:

20
40
60
100
120
0

What is the output of the pseudocode?

(1 mark)

Continued ...

QUESTION 5 [10 Marks]

a. Convert the following flowchart in **Figure 2** to pseudocode.

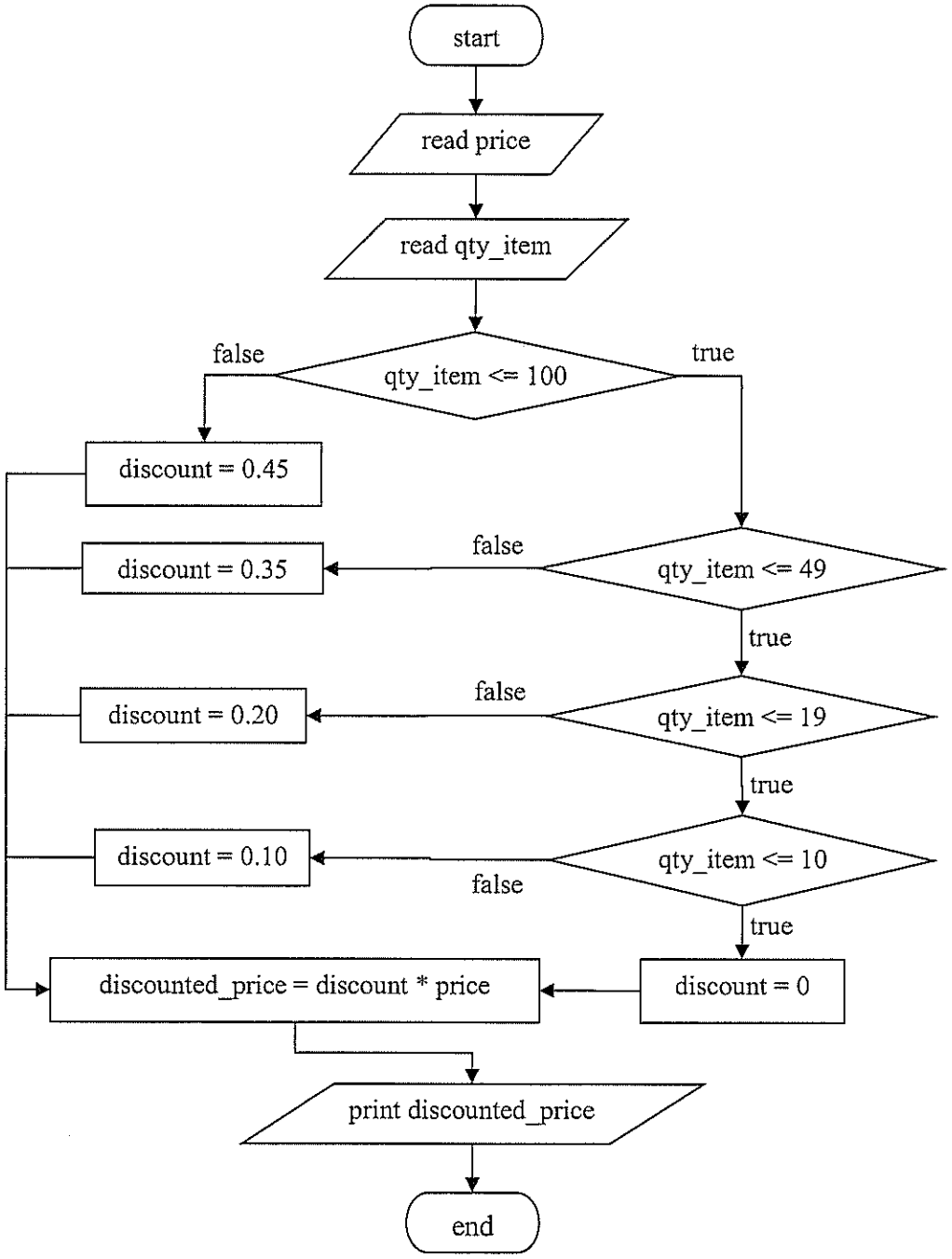

Figure 2

(5 marks)

Continued ...

b. Tickets for World Badminton Championship Final 2018 will start on sales next week. **Table 4** is the input-processing-output (IPO) chart that describes the process to find the number of tickets sold, tax amount and total cost. Based on the processing described in **Table 4**, develop a flowchart to show the solution.

Table 4

Input	Procesing	Module Reference	Output
The number of tickets The color of the seats	1. Repeat Read number of tickets. Read color of the seats. If the color is orange the price = 100. If the color is brown the price = 80 otherwise, the price = 50. Subtotal = multiply the price of the ticket with the number of tickets. Tax = multiply subtotal with 6%. Totalcost = add tax to subtotal. Print number of tickets, tax amount and total cost. Ask if the user wants to continue. Until (continue = = "no")	 Read Read Calculate Calculate Calculate Print Read	The number of tickets The tax amount The total cost

(5 marks)

End of Paper